

CLAIMS

1. A remote station apparatus comprising:
 - a multi-element antenna configured to receive signals from at least one transmitter and to output highly correlated signals from the respective transmitter; and
 - a controller configured to receive the highly correlated signals and to combine the correlated signals to reproduce the signal transmitted from a selected one of the at least one transmitter.
2. A remote station as defined in Claim 1, wherein the multi-element antenna is a dual element antenna.
3. A remote station as defined in Claim 1, wherein the multi-element antenna has an envelope correlation of greater than about 0.7.
4. A remote station as defined in Claim 1, wherein the controller determines a spatial signature of each signal received from the at least one transmitter.
5. A remote station as defined in Claim 4, wherein the controller further comprises a weighting factor engine configured to determine a set of weighting factors for each of the at least one transmitter signals in response to the spatial signatures of the received signals.
6. A remote station as defined in Claim 5, wherein the controller further comprises a combiner configured to combine the received signals using the weighting factors to reproduce the signal from a selected one of the at least one transmitter.
7. A remote station as defined in Claim 6, wherein the received signals are combined using an optimal combiner.
8. A remote station as defined in Claim 6, wherein the received signals are combined using a maximal ratio combiner.

9. A remote station as defined in Claim 1, wherein the received signals are
CDMA signals.

10. A remote station apparatus comprising:

a multi-element antenna configured to receive signals from at least one
transmitter and to output highly correlated signals from the respective transmitter;
and

a controller configured to accept the highly correlated signals from the
multi-element antenna and to combine the highly correlated signals to maximize
the ratio of a preferred signal amplitude to the signal amplitude of other received
signals.

11. A remote station as defined in Claim 10, wherein the multi-element
antenna has an envelope correlation of greater than about 0.7.

12. A remote station as defined in Claim 10, wherein the multi-element
antenna is a dual element antenna.

13. A remote station as defined in Claim 10, wherein the controller further
comprises at least two search engines, each search engine configured to receive
in-phase and quadrature signals from an antenna element.

14. A remote station as defined in Claim 10, wherein the controller further
comprises a weighting factor engine configured to determine a set of weighting
factors for each of the at least one transmitter signals in response to the spatial
signatures of the received signals.

15. A remote station as defined in Claim 10, wherein the controller further
comprises a combiner configured to receive in-phase and quadrature signals
from each antenna element and weighting factors from a weighting factor engine,
and output an optimized in-phase and quadrature signal.

16. A remote station as defined in Claim 10, wherein the controller further
comprises a demodulator configured to receive optimized in-phase and
quadrature signals and output a demodulated signal.

17. A remote station as defined in Claim 10, wherein the received signals are
CDMA signals.

18. A wireless communication system comprising:
at least one base station configured to transmit communication signals;
and
at least one remote station configured to receive communication signals
from the at least one base station with a multi-element antenna wherein the
received communication signals are highly correlated and are combined to
reproduce the communication signal transmitted from a selected one of the at
least one base station.

19. A wireless communication system as defined in Claim 18, wherein the
multi-element antenna is a dual element antenna.

20. A wireless communication system as defined in Claim 18, wherein the
multi-element antenna has an envelope correlation of greater than about 0.7.

21. A wireless communication system as defined in Claim 18, wherein the at
least one remote station further comprises a controller configured to determine a
spatial signature of each communication signal received from the at least one
base station.

22. A wireless communication system as defined in Claim 21, wherein the
controller further comprises a weighting factor engine configured to determine a
set of weighting factors in response to the corresponding spatial signatures for
each of the communication signals received.

23. A wireless communication system as defined in Claim 22, wherein the
controller further comprises a combiner configured to combine the

communication signals received using the weighting factors to reproduce the
4 signal from a selected one of the at least one transmitter.

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24. A wireless communication system as defined in Claim 23, wherein the
2 communication signals received are combined using an optimal combiner.

25. A wireless communication system as defined in Claim 23, wherein the
2 communication signals received are combined using a maximal ratio combiner.

26. A wireless communication system as defined in Claim 18, wherein the
2 received signals are CDMA signals.

27. A method of processing a multipath signal comprising:
2 receiving signals from at least one transmitter at multiple antennas;
identifying a preferred transmitter among the at least one transmitter, from
4 which a desired signal was received;
producing a signal from each antenna such that the produced signals are
6 highly correlated and contain signal components of the desired signal from the
preferred transmitter, and interfering signals; and
8 combining two or more of the highly correlated signals to maximize the
ratio of the desired signal amplitude to the interfering signal amplitude.
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28. A method as defined in Claim 27, wherein combining the received signals
2 further comprises:

determining a spatial signature of each signal received from the at least
4 one transmitter;

determining a set of weighting factors for each received signal in response
6 to the spatial signatures of the received signals; and

reproducing a signal corresponding to the desired signal received from the
8 preferred transmitter using the weighting factors.

29. A method as defined in Claim 27, wherein the received signals are
2 combined using an optimal combiner.

30. A method as defined in Claim 27, wherein the received signals are
2 combined using a maximal ratio combiner.

31. A method as defined in Claim 27, wherein the received signals are CDMA
2 signals.

32. A method of processing a signal in a wireless communication system, the
2 method comprising:

receiving a signal from multiple transmitters with a highly correlated multi-
4 element antenna;

determining a spatial signature of each signal received from the multiple
6 transmitters;

determining a set of weighting factors for each transmitter signal in
8 response to the spatial signatures of the received signals; and

combining the received signals using the weighting factors to reproduce
10 the signal from a selected one of the multiple transmitters.

33. A method as defined in Claim 32, wherein the multi-element antenna is a
2 dual element antenna.

34. A method as defined in Claim 32, wherein the multi-element antenna has
2 an envelope correlation of greater than about 0.7.

35. A method as defined in Claim 32, wherein the received signals are
2 combined using an optimal combiner.

36. A method as defined in Claim 32, wherein the received signals are
2 combined using a maximal ratio combiner.

37. A method as defined in Claim 32, wherein the received signals are CDMA
2 signals.

38. A remote station apparatus comprising:

means for receiving signals from at least one transmitter at multiple antennas;

means for identifying a preferred transmitter among the at least one transmitter, from which a desired signal was received;

means for producing a signal from each antenna such that the produced signals are highly correlated and contain signal components of a desired signal from the preferred transmitter, and interfering signals; and

means for combining two or more of the highly correlated signals to maximize the ratio of the desired signal amplitude to the interfering signal amplitude.

39. A wireless communication system comprising:

means for transmitting communication signals from at least one base station; and

means for receiving communication signals by at least one remote station, the remote station configured to receive communication signals with a multi-element antenna wherein the received signals are highly correlated and are combined to reproduce the signal from a selected one of the at least one base station.